CLAIMS

What is claimed is:

1. A modified polyolefin composition having pendant unsaturated groups and at least one other pendant functional group comprising the reaction product of a functionalized polyolefin and one or more ethylenically unsaturated compounds having a functional group reactive with the functional group on the polyolefin, wherein the functionalized polyolefin is prepared from a polyolefin having a heat of fusion of 0 to 10 calories/gram.

2. The modified polyolefin composition of claim 1 wherein the functionalized polyolefin is obtained by reacting a polyolefin polymer selected from the group consisting of ethylene copolymers prepared from ethylene and alpha olefins having 3 to about 10 carbon atoms; polypropylene; propylene copolymers prepared from ethylene or alpha olefins having from 4 to about 10 carbon atoms; poly(1-butene); and 1-butene copolymers prepared from 1-butene and ethylene or alpha olefins having 3 to about 10 carbon atoms, with monomers selected from the group consisting of unsaturated carboxylic acid esters, unsaturated carboxylic acids, unsaturated carboxylic anhydrides, vinyl monomers, acrylic monomers or mixtures thereof.

3. The modified polyolefin composition of claim 2 wherein the polyolefin polymer is an ethylene-propylene copolymer comprised of about 80 mole percent propylene and about 20 mole percent ethylene.

4. The modified polyolefin composition of claim 2 wherein the unsaturated carboxylic acid esters, unsaturated carboxylic acids, unsaturated carboxylic anhydrides, vinyl monomers, and acrylic monomers are selected from the group consisting of maleic anhydride, citraconic anhydride, itaconic anhydride, glutaconic anhydride, 2,3-dimethylmaleic anhydride, maleic acid, fumaric acid, citraconic acid, 2-pentenoic acid, 2-methyl-2-pentenoic acid, dimethyl maleate, di-n-propyl maleate,

diisopropyl fumarate, dimethyl itaconate, methyl acrylate, methacrylic acid, hydroxyethyl acrylate, ethyl acrylate, methyl acrylate, ethyl methacrylate, methyl crotanate, ethyl crotanate, hydroxyethyl methacrylate, hydroxy-propyl acrylate, hydroxypropyl methacrylate, and mixtures thereof.

5. The modified polyolefin composition of claim 1 wherein the ethylenically unsaturated compound is selected from the group consisting of hydroxyethyl acrylate, hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, polyethylene-glycol monoacrylate, polyethyleneglycol monomethacrylate, polyalkyleneglycol monomethacrylate, polypropyleneglycol monoacrylate, polypropyleneglycol mono-methacrylate, maleic anhydride, citraconic anhydride, itaconic anhydride, glutaconic anhydride, 2,3-dimethylmaleic anhydride, maleic acid, fumaric acid, citraconic acid, mesaconic acid, glutaconic acid, acrylic acid, methacrylic acid, crotonic acid, 2-pentenoic acid, 2-methyl-2-pentenoic acid, dimethyl maleate, diethyl maleate, di-n-propyl maleate, diisopropyl maleate, dimethyl fumarate, diethyl fumarate, di-n-propyl fumarate, diisopropyl fumarate, dimethyl itaconate and mixtures thereof.

6. A solvent based primer composition comprising the modified polyolefin of claim 1, a solvent, and optionally, a photoinitiator.

7. The solvent-based primer composition of claim 6 wherein the solvent is selected from the group consisting of ester solvents, ketone solvents, aliphatic solvents, aromatic solvents and mixtures thereof.

8. The solvent-based primer composition of claim 6 wherein said photoinitiator is selected from the group consisting of acetophenone and benzophenone/tertiary amine combinations; organic peroxides; benzoin and its ethers; and benzil and benzil ketals.

9. The solvent-based primer composition of claim 6 wherein said photoinitiator is added in the range of 0.01 to 8.0 weight percent based on the non-volatile, ethylenically unsaturated content of the coating composition.

10. The solvent-based primer composition of claim 6 further comprising auxillary polymerizable monomers and/or oligomers.

11. The solvent-based primer composition of claim 10 wherein said auxillary polymerizable monomers and/or oligomers is selected from the group consisting of vinyl acetate, N-vinyl pyrrolidone methyl (meth)acrylate, butyl (meth)acrylate, 2-hydroxyethyl (meth)acrylate, neopentylglycol di(meth)acrylate, triethyleneglycol di(meth)acrylate, trimethylolpropane triacrylate, (meth)acrylated urethanes, (meth)acrylated epoxies, and (meth)acrylated polyesters and polyethers.

12. A water-based primer composition comprising:

a. the modified polyolefin composition of claim 1;

b. from 18 to 50 weight percent, based on the weight of component (a), of a surfactant;

c. from 2 to 30 weight percent, based on the weight of component (a), of an amine;

d. water; and optionally,

e. a photoinitiator.

13. The water-based primer composition of claim 12 wherein said surfactant is selected from the group consisting of primary ethoxylated alcohols having 12 to 15 carbon atoms and secondary ethoxylated alcohols having 11 to 15 carbon atoms.

14. The water-based primer composition of claim 12 wherein said amine is a primary, secondary or tertiary amine selected from the group consisting of morpholine, 2-amino-2-methyl-1-propanol, triethylamine, tributylamine, ammonium hydroxide, 2-dimethylaminoethanol, triethanolamine, and 2-propylaminoethanol.

15. The water-based primer composition of claim 12 wherein said photoinitiator is selected from the group consisting of acetophenone and benzophenone/tertiary amine combinations; organic peroxides; benzoin and its ethers; and benzil and benzil ketals.

16. The water-based primer composition of claim 12 further comprising auxillary polymerizable monomers and/or oligmers.

17. The water-based primer composition of claim 16 wherein said auxillary polymerizable monomers and/or oligomers is selected from the group consisting of vinyl acetate, N-vinyl pyrrolidone methyl (meth)acrylate, butyl (meth)acrylate, 2-hydroxyethyl (meth)acrylate, neopentyl glycol di(meth)acrylate, triethyleneglycol di(meth)acrylate, trimethylolpropane triacrylate, (meth)acrylated urethanes, (meth)acrylated epoxies, and (meth)acrylated polyesters and polyethers.

18. A modified polyolefin adhesive composition comprising:

a. the modified polyolefin composition of claim 1,

b. an adhesive, and optionally

c. a photoinitiator.

19. The modified polyolefin adhesive composition of claim 18 wherein said photoinitator is selected from the group consisting of acetophenone and benzophenone/tertiary amine combinations; organic peroxides; benzoin and its ethers; and benzil and benzil ketals.

20. The modified polyolefin adhesive composition of claim 18 further comprising auxillary polymerizable monomers and/or oligomers.

21. The modified polyolefin adhesive composition of claim 20 wherein said auxillary polymerizable monomers and/or oligomers is selected from the group consisting of vinyl acetate, N-vinyl pyrrolidone methyl (meth)acrylate, butyl (meth)acrylate, 2-hydroxyethyl (meth)acrylate, neopentyl glycol di(meth)acrylate, triethyleneglycol di(meth)acrylate, trimethylolpropane triacrylate, (meth)acrylated urethanes, (meth)acrylated epoxies, and (meth)acrylated polyesters and polyethers.

22. A process for preparing a coated substrate comprising:

a. applying the modified polyolefin composition of claim 1 to a substrate;

b. exposing the modified polyolefin composition on the substrate to an amount of ultraviolet radiation sufficient to effect a degree of curing of said modified polyolefin on said substrate; and

c. applying a paint topcoat to said substrate.

23. An article of manufacture comprising a substrate and the modified polyolefin of claim 1.

24. A modified polyolefin composition having pendant unsaturated groups comprising the reaction product of a functionalized polyolefin and one or more ethylenically unsaturated compounds having a functional group reactive with the functional group on the polyolefin.

25. The modified polyolefin composition of claim 24 wherein the functionalized polyolefin is obtained by reacting a polyolefin polymer selected from the group consisting of ethylene copolymers prepared from ethylene and alpha olefins having 3 to about 10 carbon atoms; polypropylene; propylene copolymers prepared from ethylene or alpha olefins having from 4 to about 10 carbon atoms; poly(1-butene); and 1-butene copolymers prepared from 1-butene and ethylene or alpha olefins having 3 to about 10 carbon atoms, with monomers selected from the group consisting of unsaturated carboxylic acid esters, unsaturated carboxylic acids, unsaturated carboxylic anhydrides, vinyl monomers, acrylic monomers or mixtures thereof.

26. The modified polyolefin composition of claim 25 wherein the polyolefin is an ethylene-propylene copolymer comprised of about 80 mole percent propylene and about 20 mole percent ethylene.

27. The modified polyolefin composition of claim 25 wherein the unsaturated carboxylic esters, unsaturated carboxylic acids, unsaturated

carboxylic anhydrides, vinyl monomers, and acrylic monomers are selected from the group consisting of maleic anhydride, citraconic anhydride, itaconic anhydride, glutaconic anhydride, 2,3-dimethylmaleic anhydride, maleic acid, fumaric acid, citraconic acid, 2-pentenoic acid, 2-methyl-2-pentenoic acid, dimethyl maleate, di-n-propyl maleate, diisopropyl fumarate, dimethyl itaconate, methyl acrylate, methacrylic acid, hydroxyethyl acrylate, ethyl acrylate, methyl acrylate, ethyl methacrylate, methyl crotanate, ethyl crotanate, hydroxyethyl methacrylate, hydroxy-propyl acrylate, hydroxypropyl methacrylate, and mixtures thereof.

28. The modified polyolefin composition of claim 24 wherein the ethylenically unsaturated compound is selected from the group consisting of hydroxyethyl acrylate, hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, polyethylene-glycol monoacrylate, polyethyleneglycol monomethacrylate, polyalkyleneglycol monomethacrylate, polypropyleneglycol monoacrylate, polypropyleneglycol mono-methacrylate, maleic anhydride, citraconic anhydride, itaconic anhydride, glutaconic anhydride, 2,3-dimethylmaleic anhydride, maleic acid, fumaric acid, citraconic acid, mesaconic acid, glutaconic acid, acrylic acid, methacrylic acid, crotonic acid, 2-pentenoic acid, 2-methyl-2-pentenoic acid, dimethyl maleate, diethyl maleate, di-n-propyl maleate, diisopropyl maleate, dimethyl fumarate, diethyl fumarate, di-n-propyl fumarate, diisopropyl fumarate, dimethyl itaconate and mixtures thereof.

29. A solvent based primer composition comprising the modified polyolefin of claim 24, a solvent, and optionally, a photoinitiator.

30. The solvent-based primer composition of claim 29 wherein the solvent is selected from the group consisting of ester solvents, ketone solvents, aliphatic solvents, aromatic solvents and mixtures thereof.

31. The solvent-based primer composition of claim 29 wherein said photoinitiator is present and is selected from the group consisting of

acetophenone and benzophenone/tertiary amine combinations; organic peroxides; benzoin and its ethers; and benzil and benzil ketals.

32. The solvent-based primer composition of claim 29 wherein said photoinitiator is added in the range of 0.01 to 8.0 weight percent based on the non-volatile, ethylenically unsaturated content of the coating composition.

33. The solvent-based primer composition of claim 29 further comprising auxillary polymerizable monomers and/or oligomers.

34. The solvent-based primer composition of claim 33 wherein said auxillary polymerizable monomers and/or oligomers is selected from the group consisting of vinyl acetate, N-vinyl pyrrolidone methyl (meth)acrylate, butyl (meth)acrylate, 2-hydroxyethyl (meth)acrylate, neopentylglycol di(meth)acrylate, triethyleneglycol di(meth)acrylate, trimethylolpropane triacrylate, (meth)acrylated urethanes, (meth)acrylated epoxies, and (meth)acrylated polyesters and polyethers.

35. A modified polyolefin adhesive composition comprising:

a. the modified polyolefin composition of claim 24,

b. an adhesive, and optionally

c. a photoinitiator.

36. The modified polyolefin adhesive composition of claim 35 wherein said photoinitator is present and is selected from the group consisting of acetophenone and benzophenone/tertiary amine combinations; organic peroxides; benzoin and its ethers; and benzil and benzil ketals.

37. The modified polyolefin adhesive composition of claim 35 further comprising auxillary polymerizable monomers and/or oligomers.

38. The modified polyolefin adhesive composition of claim 37 wherein said auxillary polymerizable monomers and/or oligomers is selected from the group consisting of vinyl acetate, N-vinyl pyrrolidone methyl (meth)acrylate, butyl (meth)acrylate, 2-hydroxyethyl (meth)acrylate,

neopentyl glycol di(meth)acrylate, triethyleneglycol di(meth)acrylate, trimethylolpropane triacrylate, (meth)acrylated urethanes, (meth)acrylated epoxies, and (meth)acrylated polyesters and polyethers.

39. A process for preparing a coated substrate comprising:

a. applying a modified polyolefin composition of claim 24 to a substrate;

b. exposing the modified polyolefin composition on the substrate to an amount of ultraviolet radiation sufficient to effect a desired degree of curing of said modified polyolefin on said substrate; and

c. applying a paint topcoat to said substrate.

40. An article of manufacture comprising a substrate and the modified polyolefin of claim 1.

41. An article of manufacture comprising a substrate and the modified polyolefin of claim 24.